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CHARLES ROBERT OSTEN SACKEN,
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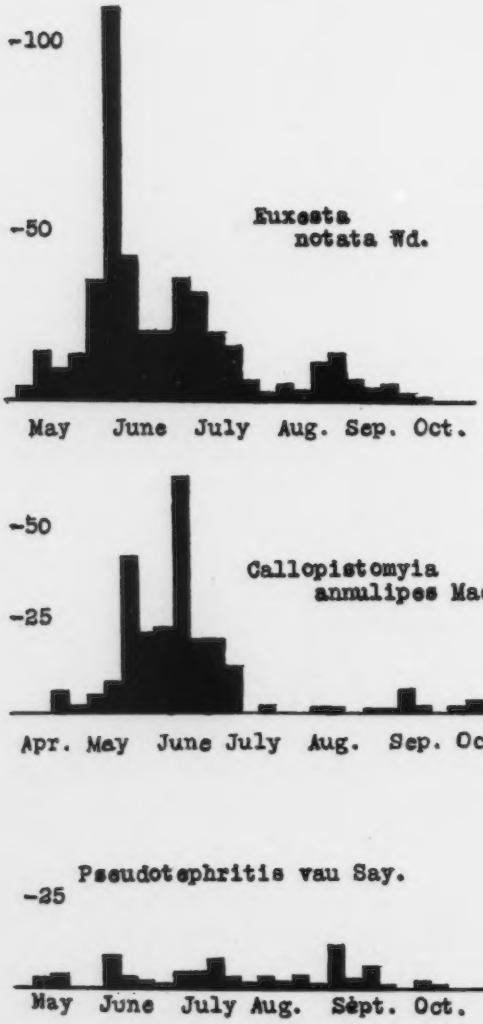

ORTALIDAE—FROST.

ENTOMOLOGICAL NEWS

VOL. XXXIX JUNE, 1928 No. 6

Notes on Ortalidae (Dipt.).

By S. W. FROST, Pennsylvania State College*

Plate IV.

Comparatively little has been published in American literature dealing with the habits of the Ortalidae. Williston ('08) remarks, "the flies are usually found about meadows or among luxuriantly growing grass." Hendel ('08-'14) has dealt with their taxonomy in considerable detail and Cresson ('20-'24) has given additional notes on their habits, distribution and descriptions of new species. Numerous papers, chiefly of an economic character have discussed the species of the genera *Euxesta, Pseudotephritis* and *Seioptera.* The habits of the other genera are little or not at all known. The accompanying records add further information on the abundance and seasonal occurence of several species.

All of the material under discussion was taken from liquid, sugar or molasses baits used as traps for the oriental fruit moth during the summer of 1927 in the vicinity of Arendtsville, Pa. These traps were in operation from March 12th until October 18th. The determinations of the species of Ortalidae were made by Mr. E. T. Cresson of the Academy of Natural Sciences, Philadelphia, Pa. The subdivisions of this family raised to family rank by some authors have not been considered in this paper. *Pyrgota* no doubt according to Hendel ('08-'14, '22) and other authors belongs in a separate family Pyrgotidae. It is structurally and biologically different and comes closer to the Conopidae and Oestridae.

It is well known that the Diptera are one of the first orders to make their appearance in considerable numbers in Spring. Johnson ('04) makes a statement to this effect but at that time records no Ortalids flying during April or May. His later

* Published by permission of the Director of the Agricultural Experiment Station of The Pennsylvania State College as a part of project No. 697. Technical paper No. 446.

paper ('25) shows that several species have been taken during these months. The writer found that the Anisopidae were the first of the Diptera to visit the baits. On March 10th, 110 specimens were taken from a single bait-pail in the vicinity of woods. A few days later Muscids and Drosophilids came in great abundance and an occasional Syrphid or Tipulid visited the pails. The most interesting of all the catches were the Ortalidae.

A few of the species as *Euxesta notata* (Wied), *Pseudotephritis vau* Say, and *Callopistomyia annulipes* Macq., were taken almost continually from April or May until October. *Callopistomyia annulipes* Macq., was the first to make its appearance. A single specimen was taken from a pail in the vicinity of woods on April 12th. Other species were taken only for short periods during the summer. The abundance of some of the species in the baits would indicate rather clearly that they visit the baits to feed. Certain types as *Pyrgota* were no doubt accidental catches.

RIVELLIA VIRIDULANS R-D. Although this species is considered somewhat common, only five specimens were taken from June 3rd to July 19th. It was previously recorded from Eastern Pennsylvania by Cresson ('24). Judging from the writer's notes and earlier records, this species does not fly early or late in the season.

CAMPTONEURA PICTA Fab. A single specimen was taken at Arendtsville June 10th, from a bait pail that was hung on a cherry tree. This species has not previously been recorded from Pennsylvania.

IDANA MARGINATA Say. Five specimens of this striking species was taken from baits, from June 15th until July 5th.

TEPHORONOTA RUFICEPS V. d. W. One specimen on July 12th, and another on August 2nd.

CALLOPISTOMIA ANNULIPES Macq. 208 specimens of this common species, from April 12th until October 18th. The males frequented the baits slightly in excess of the females.

PSEUDOTEPHRITIS CORTICALIS Loew, taken in small numbers from June 2nd until July 23rd. It is interesting to note that Johnson ('25) gives an early record, May 3rd, for this species in Connecticut. Greene ('17) also reared adults from April 16 to 18 in 1913 at Falls Church, Va. He gives excellent life history notes and figures.

PSEUDOTEPHRITIS VAU Say, frequented the baits from May 10th until October 11th. Seventy-six specimens were taken and the males and females appeared in about equal numbers.

EUXESTA NOTATA (Wied). The adults of this common species were often seen at rest on the foliage of peach trees in the orchard. Four hundred and seventeen specimens were taken in bait pails from May 10th until October 11th. The males and females came in about equal numbers. Hutchinson ('16) who has some excellent notes on the life history of this species records it as early as April 30th. He remarks that the species was abundant during May, June and July but rare during August and September.

SEIOPTERA VIBRANS Linn. Only four specimens were taken in baits from June 15th until June 28th. Johnson ('25) notes that the species was taken as late as August 8th in Connecticut.

PYRGOTA UNDATA Wied. A single specimen on June 15 from a bait pail hung on a willow tree. This was no doubt an accidental catch. The adults were, however, taken in rather large numbers during June and July at light traps. Other observers have noticed their affinity for lights although the writer believes no record has been made to this effect.

Cuscianna ('22) has some notes on chemotropic tests with Diptera in Italy that are worth mentioning here. Numerous aromatic, ethereal, balsamic and nauseous odors were used. The attraction was almost exclusively confined to the Diptera, chiefly the Anthomyiids, Tachiniids and Ortalids. Among the Ortalids the genus *Platysoma* responded most readily. The species of this genus are not sensitive to balsamic and ethereal odors but are attracted by the aromatic and nauseous odors. Hundreds of the introduced North American species *Euxesta nitidiventris* were taken with a vinegar solution.

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"Heteropod-Zoology" and "Entomological "Complexes".*

By Dr. Walther Horn, Berlin-Dahlem.†

I hope that my reader will not be too impatient with the unusual ideas that follow, and that accepting my sincerity, he will pardon me for presenting them.

Three things are very unfortunate for a prosperous development of the science of systematic entomology ("taxonomy" or "theoretical entomo-museology"):

1.) The fact that too many people do not know what a so-called "entomologist" is.

2.) The co-existence of the words "entomology" and "zoology".

3.) The existence of the word "insect-species".

If it were not for these considerations, the outlook for the future of "hexapod-zoology" *i. e.*, entomology, would be almost ideal.

I.

What is an "entomologist"? The common people of many countries of the world have no idea at all; often even the educated man must look into an encyclopedia or dictionary to find the significance of the word, of which even many zoologists are ignorant. How often I have been asked the self-same question by a member of the latter profession! I have always answered that even a zoologist who is studying insects during his entire life is not necessarily an entomologist; the purpose

*Editor, Entomological News: At the forthcoming Entomological Congress at Ithaca, Dr. Walther Horn is to give an address before the section of Taxonomy on some problems confronting the scientific workers of to-day, and this address is to be preliminary to a forum devoted to the discussion of certain special phases thereof. In accepting the invitation to deliver this address, Dr. Horn sent to Dr. Johannsen and myself a paper in English entitled "Heteropod-Zoology and Entomological Complexes," with the request that we forward it to you to publish in the News in order that it might set people thinking along the lines to be discussed at the meeting.—J. Chester Bradley.

†I have not at all the intention to say in my lecture at Ithaca that the ideas of *this* paper are identical with those I may propose as the only and best solution of the question. All these papers contain *only heuristic ideas*, and I think it may be some time before one sees what may be the best final solution—if there be one.—W. H.

actuating his work determines his status. For many years R. Goldschmidt has been studying moths, in order to discover the laws of genetics, but he is not on that account an entomologist nor has he ever claimed to be. He uses insects incidentally whether perchance occasionally, or for a long continued time, as the basic material for his research, never with the interests of "hexapod zoology" at heart, but entirely from the standpoint of genetics, a division of general zoology (biology). On the other hand a real entomologist can study other branches, as for example, chemistry, for long years without thereby losing his status as an entomologist, if he does so in order to acquire knowledge having a direct bearing upon his own field of entomology. All this, my dear reader, is of course only *my* point of view.

II.

"Entomology and Zoology"! What sense is there to the title of a professorship, or of a journal, or of a section of an institution or congress "of entomology and zoology"? I have always thought that it would be much better if we might say "hexapod-" and "heteropod-zoology." I have nothing at all against such a word as "entomo-zoology", the former expression seems to me to give perhaps a better contrast. More than one zoological museum has long since been divided into several autonomous branches: The British Museum into "Hexapod-" and "Heteropod-Zoology", the Paris Museum into five divisions, the Stockholm Museum into three, or even four, counting paleozoology. The missing link is a technical term for the whole zoological field other than insects. Does this contrast not resemble just a little the relation between a cat and a dog? These, too, recognize that they are related but by protesting!

III.

"Insect-species"! I can hardly imagine how happy an entomologist would be if there were no species! How many zoologists have raised this question? How many have tried to find a solution? How many recognize or even have a foreboding that the old significance of the word "species" is nowa-

days rapidly breaking down, since long decades ago the ideas of evolution first shook its pillars? How does a geneticist interpret the Linnaean species? How a physiologist? How a zoogeographer? How the palaeozoologist? How the ecologist? If we compare the membracid systematist with a student of Carabidae and a braconid specialist with an aphidologist, the standpoint of a Casey with that of an L. Bedel, how they disagree! But in spite of it the word "species" still stand as the ultimate foundation of the system! And what is the result? We have reached nearly the million mark of "species" and we shall continue into millions and millions more until we negative the real meaning of the word "system". We are forgetting that our system has not only an ultimate ideal—the explanation of relationships, but also a prior practical aim—the orientation of the actual state of knowledge. By trying to settle both aims at the same time, are we not, in a measure, like a man who is trying to catch two hares at once? Are we not attempting the impossible? As I have said at the Zweite Wanderversammlung Deutscher Entomologen at Stettin in 1927 (Entomologische Mitteilungen, 1927. 16: 368-375) we have for a long time been neglecting the questions of chief importance, by reason of our zeal in completing the subsidiary ones.

The most important point of all is the manner of handling "species", for that is, so to speak, the horizon from which we reckon, or if one prefers, the bricks with which we build.

Some nights ago I was sitting, as I often do in the library of my institute. The light was turned off, for the sake of economy. The books around me were closed, for I was reading *between the lines.* Suddenly somebody knocked on the door: Karl von Linné came in to see me.

"Take a seat" I said. Now my dear reader, please do not misunderstand me, since Karl von Linné, from your viewpoint, died long ago! Why, I am very sure that Karl von Linné has never died, and perhaps in some respects he was never more alive, as far as entomo-systematics are concerned, than today.

"You seem to be sad", he said.

"Yes", I answered, "and you are the cause".

"What have I done? How have I erred"?

"You created a system based upon species. How could you do that, when elsewhere you displayed such keen insight into the far distant future? You, who for example, ignorant of *Ornithodorus moubata,* nevertheless divined the role that the Acarina would same day be found to play in entomo-medicine"!*

"I built a modest house, using small bricks. Have I ever forbidden others the use of larger stones when building a greater edifice? No, it is *you,* not *I* who have been wrong. A modern factory does not use the tools of my time. The pots in the kitchen of Mrs. Horn do not entirely resemble those of my wife. Instead of using, as you have been doing, even smaller stones than mine, take the large ones which your edifice requires. See how the chemists are working. They do not try to realize all theoretically possible combinations of elements *ad infinitum,* but they study in particular those in which they stand in want, and which have a greater degree of importance; otherwise, they, too, might lose themselves, as you have perhaps done".

He then left me.

Perhaps you will understand, my dear reader? We systematists of hexapod-zoology, have always begun by dividing everything down to the smallest element. If we were working with whales, or starfish, or some such group, it would have perhaps made no difference, but our work is with insects.

As a solution, I propose the division of our taxonomy into two branches, considering each one independently in accordance with the following plan:

1.) We should endeavor to find out those characters which are *identical* for all very closely allied insect species—the smallest "groups" of species of many modern systematists, so as to give a good description of all their resulting *identical* features. Such a group would form a new systematic link

*Amoenitates Naturae, 1756, v. 3, p. 342.

for which I propose the term "complex". The size of an individual complex will vary more or less according to the individual author, but that is not a matter of importance.

2.) By such a plan we would reduce the appalling number of Linnaean species to a tolerable number of complexes in each genus. One hundred species of one genus might be reduced to twenty complexes, one thousand of another to one hundred complexes, and so on.

3.) The primary system should terminate with the complex; at which point the secondary system begins, continuing downwards as far as did the old system, that is to subspecies, aberrations, synonyms, etc. The technical term species would keep its old sense (however dubious that sense may have become); but it would not complicate as heretofore the problems of the primary system. To the makers of the primary system (I should call them primary systematists) it would be a matter of indifference whether one treats different forms as species, variations, or synonyms. How much time of the primary systematist has been lost in the past in clearing up inexplicable descriptions of doubtful forms? How much in finding out old bibliographical dates often only of historical value? How much for all those annoying questions that paralyze even the best powers of the primary taxonomist? Such questions, as for example, what species some one *would* have described 120 years ago if he had really described it instead of giving an adequate combination of words,* would lose a good deal of their pathological interest to the primary systematist, because they would be relegated to the province of the secondary systematist, who might treat them more in the manner of simple matters of history than of natural history.

4.) In regard to the relation of primary and secondary taxonomist, we must remember that each has an important function, otherwise the whole matter would go astray. The secondary taxonomist in no sense implies a second-rate classi-

*This is in reality a more complex matter than appears at first glance: the original description may have been in every way adequate for its day, but have long since become absolutely insufficient by reason of the increase of our knowledge.

fication, and there must never be the slightest suspicion of degradation in connection with the role. Detail and "en gros" are always of co-ordinate importance. Nevertheless we must not forget that in a measure the primary taxonomists must play the role of the leaders of an army, the secondary taxonomists that of a battalion. Such a comparison shows exactly the intimate relation between the two; the one can become, or replace the other. The whole question becomes a matter of organization: both of the workmen have to go hand in hand.

5.) The work of the future for by far the greater number of entomologists must be the detail of the secondary taxonomist, for whom the smaller collections and libraries will suffice. The natural course of development would be that the taxonomists of the larger museums would have better opportunities and fitness for the problems of primary taxonomy, those of the smaller or private collections for the problems of secondary taxonomy; but in no instance must the mere position of the systematist determine the matter without regard to his personal qualifications.

6.) For practical and theoretical purposes the term species will remain the same as heretofore. The rules of nomenclature will not be changed. As a name for the individual complex, I would propose a combining of the oldest name by a hyphen with the best known species of the complex. In this way a fair mnemo-technical name might result. A solution of the question of the taxonomy of hexapod-zoology by cancelling the existence of the species, seems to me to be, at least for our time, an impossibility.

7.) The interpolation of the complex is in no sense a warrant for a less precise handling of the matter of species than heretofore.

8.) The citation of literature under each complex might give only the names of species, adding perhaps large races and doubtful species, and the *leading* literature, reserving all details for the work of the secondary systematist.

9.) If the time comes, as eventually it will, when the pri-

mary system is sufficiently advanced, it will be easy to combine the two branches, as one is in all essential points a continuation of the other. Therefore no work done will be fruitless; the complexes will stand as very useful divisions. In many groups of insects this stage of development has already been long attained, or in others soon will be.

10.) My proposal destroys nothing of the Linnaean system, but adds just a little. In the future the settling of dubious species will appear of higher value to science than the describing of innumerable new ones. Let us digest more thoroughly what we have eaten, before we again overload our stomachs!

In conclusion, dear reader, please do not forget that not alone is Nature guilty of the destruction of our modern so-called system of Hexapod-Zoology by the creation of too many species, but that the systematists themselves have perhaps, to some extent, lost their own way.

Remarks on Photographic Labels for Insects.

By HARRY H. KNIGHT, Ames, Iowa.

In the March number of ENTOMOLOGICAL NEWS (1928), Mr. W. A. Hiestand has called attention to the convenience of using photographic labels for giving desired data on pinned insects. Since the writer has for some years been making labels by the photographic method he might be pardoned for offering two or three additional points which he believes worth while.

Photographic labels as I have seen them coming in on specimens are usually very poor, frequently darkened and nearly illegible. Unless good labels are made I would suggest not using them. One of the most important items in the whole process is to make use of the best photographic printing paper for the purpose. Regular Azo paper is too thin to set well on a pin, and at the same time tends to curl badly, especially in a dry climate, or in winter when zero air is warmed to room temperatures. Any non-curling paper is an improvement but not all brands are of the proper thickness. After consider-

able testing, the best photographic paper tried up to the present time is the Eastman Vitava Alba A4, which is a smooth white, semi-matte, single weight, non-curling paper of proper contrast to give clear black and white labels. This paper also takes ink very well which is a great advantage when one wishes to fill in dates.

The locality labels shown by Mr. Hiestand are good but I would suggest deleting the line with "collector" and save space, since the name appearing on the third line is generally understood among entomologists as representing the name of the collector. Where small insects are labeled, it is a great convenience for those doing the determination work, if the labels are kept small so that a view may be had of the ventral surface of the specimen without removing the label. For this practical reason I always try to get all the data on a three line label, and employ four lines only when adding host plant or similar information.

Another important use to which the photographic method may be put is in making determination labels to go on the pin. I refer to those where the name is printed in full and can be quickly applied to the determined specimen. I would especially recommend this practice for those who are doing monographic work, naming large numbers of specimens to be returned to various institutions or collectors. Because of the time consumed it rarely occurs that the worker will take the trouble to write out by hand more than one or two labels for each species. Thus many specimens may be labored over under the microscope, never to receive an individual label after the determination is worked out. There is a distinct loss in the value of such specimens. To overcome this difficulty I would recommend the use of photographic name labels to go on the pin beneath the locality label.

For the winning of those who may be inclined to try this method I will describe the type of name label used by Dr. C. E. Mickel, Dr. H. M. Harris and myself. It is a three line label which is only a little wider than the usual locality label. The genus name appears on the first line, species name and author on the second line, while the third line has the name of

the person who makes the determination, prefaced by "Det." The desired name labels may be run off on the typewriter in the usual manner, always single spacing to be rid of surplus width in labels. From a negative taken from three or four sheets of such labels, arranged to save space, 25 or more prints are made. These prints are cut up, the species sorted into envelopes, and, for filing, a sample label is pasted on the left hand corner of the envelope flap. Small envelopes are preferable and can be alphabetically arranged in a box. It takes only a few seconds to find the correct label and remove one or more with forceps for placing on the determined material. To prevent mistakes the label should be checked by reading as it is placed on the specimen.

I believe that individual determination labels enhance the value of carefully determined specimens, and the photographic label offers a feasible solution of the time saving desired. For those who may wish to try making such labels, I will be glad to send samples on request.

Undescribed Species of Crane-Flies from Chile (Dipt.: Tipulidae).

By CHARLES P. ALEXANDER, Amherst, Massachusetts.

The species herein described as new were included in extensive series of these flies taken in the vicinity of Concepcion and in the Valley of Marga-marga by Fathers Jaffuel and Pirion, who have added greatly to our knowledge of the fauna and flora of Chile. The types of the novelties are preserved in my collection through the generosity of the collectors. Their detailed study of the Valley of Marga-marga (*See* Jaffuel and Pirion, Plantas fanerogamas del Valle de Marga-marga, *Revista Chilena de Historia Natural*, 25:350-405; 1921) has shown that the South Chilean or Antarctic element of the fauna and flora extends much further to the north than has been generally appreciated, presumably occurring in favored localities or "islands," in a manner quite similar to that of the Canadian "islands" in New York and New England.

Cryptolabis (Baeoura) advena sp. n.

General coloration gray, the praescutum with four ill-defined brown stripes; halteres pale; wings with *Rs* elongate; cell

1st M_2 closed; male hypopygium with the dististyle subterminal in position.

♂. Length about 4.2 mm.; wing 4.5-4.6 mm. ♀. Length about 4.4 mm.; wing 5.3 mm.

Rostrum and palpi black. Antennae black throughout, of moderate length, if bent backward extending about to the wing-root; flagellar segments elongate-oval, with long verticils. Head light gray.

Pronotum brownish gray, with a yellow spot on either side behind. Anterior lateral pretergites conspicuous, pale yellow. Mesonotum gray, the praescutum with four ill-defined brown stripes, the lateral pair broader, tending to become obsolete; posterior lateral angles of the scutal lobes yellow; scutellum dark brownish gray, more reddish brown posteriorly. Pleura dark gray, the dorso-pleural region obscure yellow, clearer posteriorly. Halteres pale. Legs with the fore coxae dark brown, the middle and hind coxae, and the trochanters, paler brown; remainder of legs dark brown.

Wings with a yellowish gray suffusion, brighter basally; stigmal region infuscated; veins brown, those before the cord somewhat paler. Venation: Sc_1 ending just before the fork of *Rs*, Sc_2 slightly removed from its tip, Sc_1 alone subequal to *m-cu*; *Rs* very long, approximately three times *R* alone; $R_2+_3+_4$ relatively short, a little longer than *r-m*; R_2+_3 a little longer, gently arcuated; R_2 a little shorter; veins R_3 and R_4 somewhat divergent, cell R_2 being nearly parallel or even slightly narrowed at margin; cell *1st* M_2 closed; *m-cu* at near midlength of the cell; vein *2nd A* nearly straight to very gently sinuous.

Abdomen dark brown, the hypopygium a little brighter. Male hypopygium with the basistyle elongate, produced beyond the point of insertion of the dististyle, the apical lobe approximately two-thirds the more enlarged main portion of the style; on mesal face a long, pale blade; in slide mounts directed mesad. Dististyle appearing as a flattened blade, more expanded at tip, the mesal face just beyond midlength bearing a slender, black rod, its tip obtuse; surface of style set with long conspicuous setae. Phallosome a broadly expanded plate, the apex more narrowed, produced into two blackened points on either side of the aedeagus.

Holotype: ♂, Perales de Marga-marga, January 1927 (*A. Pirion*). *Allotopotype*: ♀, February, 1927. *Paratopotypes*: 2 ♂♂, with the holotype.

This is the first species of the subgenus *Baeoura* to be described from the New World.

Molophilus monostylus sp. n.

General coloration dark brown; antennae relatively short, black throughout; halteres pale yellow; wings with a yellowish gray suffusion; petiole of cell M_3 relatively short; male hypopygium with a single dististyle, this subterminal in position, tridentate.

♂. Length about 4.6 mm.; wing 5.6 mm.

Rostrum and palpi black. Antennae black throughout, relatively short, if bent backward scarcely attaining the wing-root; flagellar segments cylindrical, with a short dense white pubescence. Head dark gray.

Pronotum dark brown, the scutellum buffy with brown setiferous punctures. Anterior lateral pretergites yellow. Mesonotum dark brown, very slightly pruinose, the humeral region of the praescutum obscure yellow; pseudosutural foveae elongate, pale brown; scutellum brownish yellow posteriorly. Pleura dark brownish gray, the anterior portion of the dorsopleural region obscure yellow. Halteres pale yellow. Legs with the coxae dark brown, the remaining coxae and trochanters more testaceous; remainder of legs brown, the tips of the femora broadly dark brown, the tips of the tibiae more narrowly so; terminal tarsal segments brownish black; fore legs broken.

Wings with a pale yellowish gray suffusion, the costal region brighter yellow, the axillary region more dusky; veins darker than the ground-color; macrotrichiae dark brown. Venation: R_2+_3 gently arcuated, about twice R_4+_5; petiole of cell M_3 relatively short, only about one-fourth longer than *m-cu;* vein *2nd A* of moderate length, ending about opposite one-fourth the length of the petiole of cell M_3.

Abdomen dark brown, the hypopygium a little brighter. Male hypopygium with the basistyle produced apically into a small, slender lobe. A single dististyle, subterminal in position, conspicuously trifid, the base broad; outer arm a long black spine, middle arm longest, slender, ending obtusely; inner arm shortest, appearing as a short black spine. Aedeagus very long and slender.

Holotype: ♂, Concepcion, October 13, 1927 (*Jaffuel and Pirion*).

Molophilus monostylus is a very distinct species that must be considered as representing a separate group of the genus,

distinguished by the single subterminal dististyle, which gives to the hypopygium a strong superficial resemblance to *Erioptera*.

Molophilus gymnocladus sp. n.

Belongs to the *plagiatus* group; general coloration brown; antennae dark brown throughout; knobs of the halteres yellow; male hypopygium with the basal dististyle deeply bifid, the stem a little longer than wide, the branches acutely pointed, smooth or approximately so.

♂. Length about 3.5-3.7 mm.; wing 4.3-4.8 mm.

Rostrum and palpi dark brown. Antennae (♂) relatively long, dark brown throughout, if bent backward extending to shortly beyond the wing-root; flagellar segments oval with a conspicuous erect white pubescence. Head dark brown.

Pronotum dark brown, the posterior notum obscure yellow. Anterior lateral pretergites light yellow. Mesonotum rather light brown, the scutellum more testaceous brown. Pleura a little darker brown than the notum. Halteres yellow, the stem a little more dusky, the knobs light yellow. Legs with the coxae brownish testaceous; trochanters obscure yellow; remainder of legs brown, the femoral bases more yellowish; fore tibiae (♂) with a relatively long, slightly dilated, subbasal, blackened ring.

Wings with a grayish suffusion, the base and costal region more yellowish, the axillary region a trifle darker; veins brown; macrotrichiae dark brown. Venation: $R_{5}+_{3}$ only slightly arcuated, nearly twice $R_{1}+_{5}$; vein *2nd A* ending about opposite one-third the length of the petiole of cell M_{2}.

Abdomen dark brown, including the hypopygium. Male hypopygium with the basal dististyle deeply bifid but not so profoundly so as in *flavidus* and allies, the stem being longer than wide; outer branch longest, nearly glabrous, on outer margin before apex with one or two small, appressed denticles; inner arm about four-fifths the length of the outer and more slender, narrowed gradually to the long acute point, the surface smooth.

Holotype: ♂, Concepcion, October 13, 1927 (*Jaffuel and Pirion*). *Paratopotype*, ♂.

Molophilus gymnocladus is allied to *M. flavidus* Alexander and allied species but differs in the much longer stem of the basal dististyle, which is here longer than wide instead of the reverse.

A Synopsis of the Species of Pachycysta (Hemip.: Tingitidae).

By CARL J. DRAKE, Ames, Iowa.

The genus *Pachycysta* was erected by Champion, Trans. Ent. Soc. Lond., 1898, p. 59, for a new species which he describes on the same page. Since that time only one other species has been described and a third is characterized herein.

This genus is most closely allied to *Megalocysta* Champion, but differs from it in having the third antennal segment practically truncate at the apex and the pronotum strongly tricarinate, the lateral carinae being strongly incurved. The nervures of hood, carinae, paranota and elytra are stout and thickly pilose. The bucculae are either open or closed in front. Nothing is known regarding the food plants or biology of the species.

Key to the species of Pachycysta.

1. Paranota strongly narrowed towards outer margin (largely along the anterior margin), the outer margin very narrow and jointly rounded with both anterior and posterior margins 2
   Paranota not strongly narrowed, the outer margin broad .....*P. diaphana* Champ.
2. Elytra considerably constricted beyond the middle; discoidal area uniformly elevated, very broad beyond the middle to apex and there broadly rounded.....*P. championi* Drake
   Elytra not constricted; discoidal area strongly elevated along the discoidal area, broadest beyond the middle, angulate at apex .....*P. schildi,* n. sp.

PACHYCYSTA DIAPHANA Champion.

Pachycysta diaphana Champion, Trans. Ent. Soc. Lond., 1898, p. 59, Pl. II, fig. 6.

The type of this insect, a female from Brazil, has been beautifully figured by Champion. The paranota, discoidal area and shorter antennae distinguish it at first sight from its congeners.

PACHYCYSTA CHAMPIONI Drake.

Pachycysta championi Drake, Bul. Mus. Nat. Hist., Vol. XXVII, 1921, p. 344, fig. I.

This species resembles *P. schildi,* n. sp., from which it may be distinguished by the characters given in the key, the longer

third segment of the antennae, shorter legs and darker color. Known only from the type locality, Chochabamba, Bolivia, South America.

Pachycysta schildi, n. sp.

Elongate, broad, very dark brown, the legs and antennae much darker, the areolae hyaline. Antennae long, stout, clothed with numerous short hairs; segment I a little stouter and twice as long as II, the latter smaller at its base; III very long, slightly curved; IV with its terminal half broken off. Rostral channel widening posteriorly, open behind, the sides testaceous; rostrum very long and stout, contiguous with the median line of head, enlarged toward the tip, the tip distinctly knobbed, antero-lateral spines much shorter, testaceous, enlarged distally, contiguous with head, extending as far forward as median spine.

Pronotum strongly swollen thru disc, coarsely pitted, the triangular portion reticulate, tricarinate, the lateral carinae curved as in other species of the genus; lateral carinae very long, each composed of a single row of rather large areolae; median carina yellowish brown, more foliaceous, the areolae much larger. Hood large, the sides flattened, highest a little behind the middle, rounded above, slightly longer than high. Paranota strongly reflexed, strongly dilated, widely reticulated, wide at the base but becoming much narrower towards lateral margin and there narrowly rounded, the anterior and posterior margins slightly recurved.

Elytra broad, widely reticulated, narrow at the base; costal area broad, mostly triseriate, quadriseriate at widest point, the areolae large and not very irregularly arranged; subcostal area biseriate, its surface almost in a vertical plane; discoidal area large, bounded by a prominent costate nervure, the outer portion jointly raised with subcostal area and more strongly raised along the middle and at apex, widest just beyond the middle, gradually narrowed towards base but abruptly narrowed at apex, not extending to middle of elytra. Nervures of hood, paranota, carinae and elytra thick and rather densely clothed with very fine pile. Wings a little longer than abdomen. Male claspers very large, strongly curved, hairy at base. Length, 4.43 mm.; width, 2.11 mm.

Holotype, male, Costa Rica (Suize Tur'lba) [Turrialba]. collected by Mr. P. Schild, in author's collection. Aside from the characters given in the key, the darker color, longer legs and antennae, and nonconstricted elytra set off this species from *P. championi* Drake.

Chironomus quadripunctatus Malloch (Dipt.: Chironomidae).

By F. F. CARPENTER, Roosevelt High School, Dayton, Ohio.

Plates V and VI.

While observing a large bed of yellow pond lilies, *Nymphaea advena Ait.*, in Eagle Lake, Kosciusko County, Indiana, I noticed that a number of leaves and stems had wrinkled, turned yellow and were apparently dead. Since the growing season was not over it occurred to me that there must be some specific reason for this condition. Stems in various stages of decay were examined and all of them were found to be infested by small "blood worms". These "blood worms" were also found to be inhabiting green stems.

Repeated observations proved that these organisms burrowed into the stems from without, cutting a round hole through the epidermis, then pushing their way, usually upward, through the porous stem. After a period of time other holes were cut through the outer surface near which these larvae attached themselves to pupate. After the pupating period the adult emerged through one of these openings in the stem, rested on a nearby object and flew away. Emergence was found to occur late in the afternoon or at night.

These larvae were blood red in color with stout bodies and well developed mouth parts, and measured from 15 to 17mm. in length. A microscopic examination of the digestive tract which revealed particles of stem fibers, suggested that the larva had been feeding on the lily stems.

The following method was employed in order to determine the average number of larvae inhabiting a stem. A heavy wire, enclosing a quadrat one meter square, was lowered over the top of the lily stems and all stems in this area were cut and examined for larvae.

Station	No. lily stems	No. infested	No. Larvae
1	100	50	138
2	92	40	103
3	88	44	136

The total of stems examined was 280, of which 134 were infested. The total number of larvae taken from these stems

was 377, an average of 2.8 larvae in each infested stem, or an average of 1.3 in all stems examined in representative stations.

It is not contended that the larvae caused the death of all the yellow water lily stems, yet it is a fact that their burrowing and feeding affect these stems both directly and indirectly. Directly, in that the tissue is destroyed by feeding, and indirectly, by breaking the epidermis, opening the path for decomposition.

The technique used in associating this larva with the adult was simple. A cylinder made of wire screen about four inches in diameter and eighteen inches long was covered with mosquito netting which extended about six inches above and below the ends of the screen. This covered cylinder was placed over the stem and tied at each end to the stem, thus preventing the escape of the imago.

A check was made by bringing infested parts of stems to the laboratory and placing them in covered counting pans where the larvae were observed to feed, pupate and emerge. Other larvae were placed in a small aquarium, fed with juice and shreds of the lily stems, and were also observed to pupate and emerge. Specimens of various stages in the life history were thus obtained.

My own efforts at classification assured me that I had the midge, *Chironomus quadripunctatus,* the male of which has been originally described by Malloch. But to verify my classification I sent a male specimen to Dr. O. A. Johannsen, who kindly confirmed my conclusion. Later I compared my specimen with the type specimen which is in the Illinois State Laboratory of Natural History, Urbana, Illinois.

The exact length of time the larva lives was not determined because artificial conditions of the laboratory seemed to affect their development in such a way as to hinder natural growth, causing them to immediately start pupating. The average length of time in the pupa stage, under conditions observed, was from five to seven days. The adult was never observed to feed but was kept alive as long as seven days.

Specimens of all stages were collected in the following lakes of Northern Indiana during the summers of 1925, '26, '27:

Cellars, Cedar, Chapman, Huffman, Barbee, Palestine, Wawasee and Webster. They were also observed in other lakes where yellow pond lilies were growing.

After collecting the original descriptions of the American species of *Chironomus,* I find no mention of any midge found associated with lily stems as discussed in this paper. However, Dr. Johannsen informs me that a species with similar habits is found in Europe.

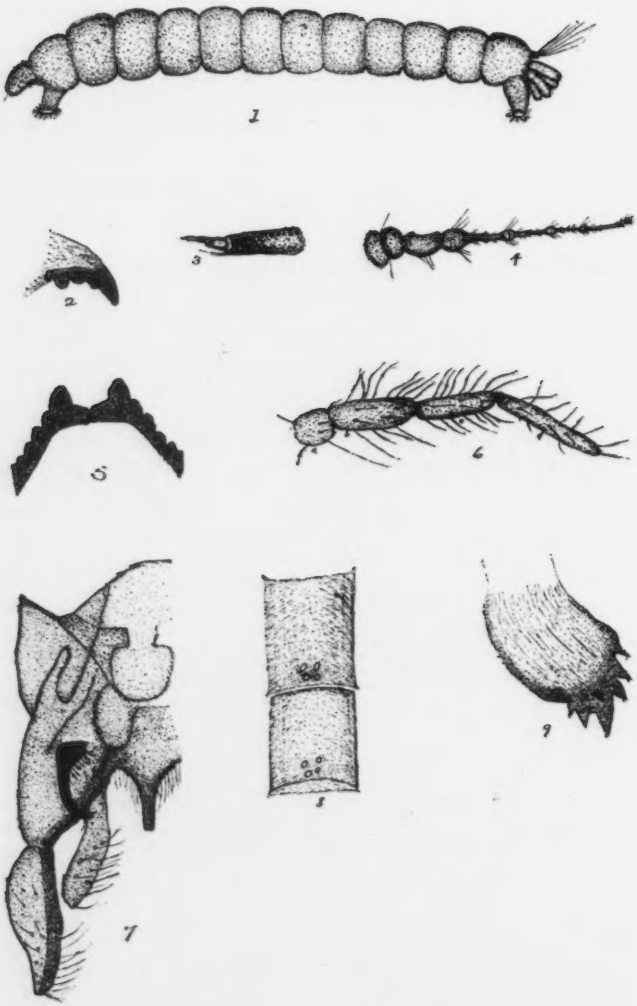
CHIRONOMUS QUADRIPUNCTATUS. Malloch.

Chironomus quadripunctatus. Malloch. Bull. Ill. Lab. 10:437.

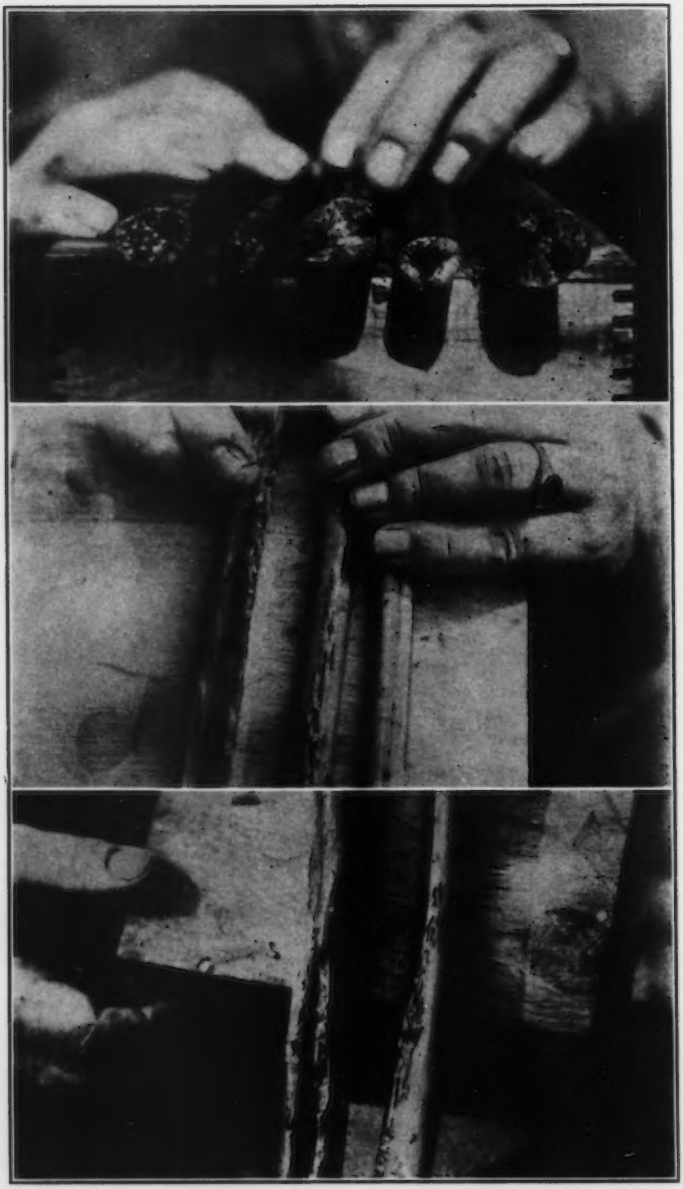
Larva. Blood-red, length 15 to 17 mm., general appearance as in pl. V, fig. 1. Head brown, slightly longer than broad, a few long hairs scattered over dorsal surface of head. Antenna short and stout with five joints, basal joint as long as the remaining four, third joint longer than second. Labium broad, teeth as in pl. V, fig. 5, distinctly darkened, six on each side. Mandibles stout, with five teeth counting apical one, fourth from apex longer and larger than second, third or fifth, all distinctly blackened. Anterior pseudopods with numerous hairs on apices. Posterior pairs of prolegs armed with apical claws. Abdominal segments with scattered setae, eleventh segment without ventral blood-gills, four anal blood-gills covered with numerous soft hairs, dorsal tufts consisting of about twelve hairs, basal papillae short.

Pupa. Reddish brown, frontal tubercles not prominent, thoracic respiratory organs present, white and greatly branched, the larger branches made up of bundles of whitish threads. On posterior margin of abdominal segment is a transverse row of rather conspicious, blackish spines. Dorsal abdominal segment covered with microscopic setae. Eighth abdominal segment with lateral fin as in pl. V, fig. 9. Caudal fin with white mat of hairs. Caudal hairs longer than those lateral. Length, about 13 mm.

♀. Antennal hairs yellowish, basal joint of antenna amber color, head reddish brown, segments of palpus as in pl. V, fig. 6. Segment (a) distinctly thicker and about three times shorter than segment (d), segment (c) about twice as long as (a) and about the same length as (b). Mesonotum brownish, divided by a median line which is slightly raised making a space between lateral vittae and median line appear as a strip slightly lighter in color than vittae. Metanotum chocolate brown. Vittae slightly darker. Halteres yellow.



CHIRONOMUS QUADRIPUNCTATUS.—CARPENTER.



LILY STEMS PARTLY DESTROYED BY CHIRONOMUS QUADRIPUNCTATUS.—CARPENTER.

Abdomen stout, tapering very little posteriorly. Body segments dark brown, body hairs yellowish, posterior marginal segment bands pale yellow and narrow. Abdominal segments 2-6 near posterior margin bearing four glassy spot-like dots, usually arranged in a quadrilateral figure as in pl. V, fig. 8. Legs light brown, coxae and sternoplurae brownish. Fore tarsi with hairs and slightly longer than fore tibiae. Tibia joint in midpair slightly darkened. Mid and hind tibiae with hairs longer than diameter of leg. Wings iridescent in strong light. Cubitus fork near the middle, crossvein slightly before. Wings rather widely spread at tips when at rest. Length, 8-9 mm.

Eggs. Never were found.

Male. The male was originally described by Mr. J. R. Malloch. Type locality was given as Lake Delavan, Wisconsin, collected by Mr. C. A. Hart, September 7, 1892.

I have seen the specimen originally described by Malloch and found it to be in a very poor condition, however, I am convinced that the species compared are the same and that Malloch's description is adequate.

I have greatly appreciated advice and criticism of Dr. W. Scott and Dr. A. C. Kinsey, both of the Department of Zoology, Indiana University.

PLATE V.

Structural Details of *Chironomus quadripunctatus.*

Fig. 1. General outline of larva.
Fig. 2. Mandible of larva.
Fig. 3. Antenna of larva.
Fig. 4. Antenna of female.
Fig. 5. Labium.
Fig. 6. Palpus of female.
Fig. 7. Hypopygium.
Fig. 8. Body segments, dorsal view, showing four oval glassy spots found on segments 2-6.
Fig. 9. Apical lateral process found on segment 8 of pupa.

PLATE VI.

Photographs Showing Yellow Lily Stems Party Destroyed by *Chironomus quadripunctatus.*

Fig. 1. Cross section of stems cut about four inches from root stalk.
Figs. 2 and 3. Longitudinal sections showing stages of attack by larva.

Some Entomology of Bartholomew's De Proprietatibus Rerum.

By HARRY B. WEISS, New Brunswick, N. J.

During medieval times entomology as we now understand that term was practically non-existant. However, those who laid claim to any erudition at all had a slight general knowledge of some insects, gained, probably for the most part, from Bartholomew's *De proprietatibus rerum*, or On the Properties of Things. This is an encyclopedic, elementary work of nineteen "books" which circulated in manuscript form in the latter part of the thirteenth and early fourteenth century and later in printed form up to the sixteenth century, having been translated into English, Spanish, French and Dutch. It was written, according to the author, to explain the references to natural objects in the Scriptures, but Bartholomew did more than simply compile his material, and frequently incorporated information on contemporary affairs. The nineteen books deal with various apparently unconnected subjects such as God, angels, demons, the soul, family life, medicine, the heavens, time, "form and matter," the air and its animals, weather, water and fish, the earth, geography, minerals, the properties of animals, color, odor, etc., and numerous authorities are cited. Part of its value at present consists of the conception it gives one of the medieval state of mind and of the status of science, natural history, geography, etc., in the Middle Ages.

Insects such as bees, flies, crickets, locusts, come in for some attention, and as an example of Bartholomew's treatment there is quoted below, some passages on bees from Trevisa's translation (1397) of Bartholomew's work. These have been extracted from Robert Steele's "Mediaeval Lore from Bartholomew Anglicus" (London 1924) in which obsolete grammatical forms have been replaced by modern ones and the spelling modernized.

"The properties of bees are wonderful, noble and worthy. For bees have one common kind as children, and dwell in

one habitation, and are closed within one gate; one travail is common to them all, one meat is common to them all, one common working, one common use, one fruit and flight is common to them all, and one generation is common to them all. Also maidenhood of body without wem is common to them all, and so is birth also. For they are not medlied with service of Venus, nother resolved with lechery, nother bruised with sorrow of birth of children. And yet they bring forth most swarms of children.

"Bees make among them a king, and ordain among them common people. And though they be put and set under a king, yet they are free and love their king that they make, by kind love, and defend him with full great defence, and hold [it] honour and worship to perish and be spilt for their king, and do their king so great worship that none of them dare go out of their house, nor to get meat, but if the king pass out and take the principality of flight. And bees chose to their king him that is most worthy and noble in highness and fairness, and most clear in mildness, for that is chief virtue in a king. For though their king have a sting yet he useth it not in wreck. And also bees that are unobedient to the king, they deem themselves by their own doom for to die by the wound of their own sting. And of a swarm of bees is none idle. Some fight, as it were in battle, in the field against other bees, some are busy about meat, and some watch the coming of showers. And some behold concourse and meting of dues, and some make wax of flowers, and some make cells now round, now square with wonder binding and joining, and evenness. And yet nevertheless, among so diverse works none of them doth espy nor wait to take out of other's travail, neither taketh wrongfully, neither stealeth meat, but each seeketh and gathereth by his own flight and travail among herbs and flowers that are good and convenable.

"Bees sit not on fruit but on flowers, not withered but fresh and new, and gather matter of the which they make both honey and wax. And when the flowers that are nigh unto them be spent, then they send spies for to espy meat in further places. And if the night falleth upon them in their journey, then they lie upright to defend their wings from rain, and from dew, that they may in the morrow tide fly the more swifter to their work with their wings dry and able to fly. And they ordain watches after the manner of castles, and rest all night until it be day, till one bee wake them all with twice buzzing or thrice, or with some manner trumping; then

they fly all, if the day be fair on the morrow. And the bees that bring and bear what is needful, dread blasts of wind, and fly therefore low by the ground when they be charged, lest they be letted with some manner of blasts, and charge themselves sometimes with gravel or with small stones, that they may be the more stedfast against blasts of wind by heaviness of the stones.

"The obedience of bees is wonderful about the king, for when he passeth forth, all the swarm in one cluster passeth with him. And he is beclipped about with the swarm, as it were with an host of knights. And is then unneth seen that time for the multitude that followeth and serveth him, and when the people of bees are in travail, he is within, and as it were governor, and goeth about to comfort others for to work. And only he is not bound to travail. And all about him are certain bees with stings, as it were champions, and continual wardens of the king's body. And he passeth selde out, but when all the swarm shall go out. His outgoing is known certain days tofore by voice of the host, as it were arraying itself to pass out with the king."

For most of his natural history, Bartholomew depended upon Aristotle and this is quite apparent when comparisons are made. For instance, in Historia Animalium (Book V), Aristotle says:

"Of the king bees there are, as has been stated, two kinds. In every hive there are more kings than one; and a hive goes to ruin if there be too few kings, not because of anarchy thereby ensuing, but, as we are told, because these creatures contribute in some way to the generation of the common bees. A hive will go also to ruin if there be too large a number of kings in it; for the members of the hives are thereby subdivided into too many separate factions."

Again in Book IX, he writes: "At early dawn they make no noise until some one particular bee makes a buzzing noise two or three times and thereby awakes the rest; hereupon they all fly in a body to work. By and by they return and at first are noisy; then the noise gradually decreases, until at last some one bee flies around, making a buzzing noise, and apparently calling on the others to go to sleep; then all of a sudden there is a dead silence."

Little is known of Bartholomew's life. In 1230 the General

of the Franciscan Order wrote to the provincial of France asking him to send Brother Bartholomaeus Anglicus and another friar to Magdeburg in Saxony to assist him. In 1231, according to a manuscript chronicle, this was done and Bartholomew was made a teacher of theology. One gathers also, from Salimbene (Histoire Littéraire de la France, 1284) that Bartholomew lectured on the Bible at the University of Paris. The exact date of the first appearance of the *De proprietatibus rerum* is uncertain. Some authorities place it at about 1230, and others about 1248.

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THORNDIKE, LYNN. A History of Magic and Experimental Science. New York, 1923.

STEELE, ROBERT. Mediaeval Lore from Bartholomew Anglicus. London, 1924.

THOMPSON, D'ARCY WENTWORTH. Historia Animalium, (Works of Aristotle trans. into English). Oxford, 1910.

Personals

According to *Science* for April 20, 1928, Prof. and Mrs. T. D. A. Cockerell have left Siam for Australia, after conference with Dr. Kerr on the Siamese flora and with Dr. Hugh M. Smith on Siamese fishes.

Dr. H. B. Hungerford, of the University of Kansas, left on April 27 for eight months of research work in the museums of Europe. He will take with him specimens from the collections of the University of Kansas and the Smithsonian Institution, Washington, with which he is collaborating on the trip. Dr. Hungerford will spend most of the month of May in British Museums, going later to Paris, Brussels, Amsterdam, Berlin, Halle, Copenhagen, Uppsala, Prague, Vienna and Budapest.—*Science*, May 4, 1928.

Some Quantitative Results in Collecting Hemiptera.

While stopping at Wilson's Camp on Indian Lake in the Adirondacks in August, 1921, and again last August, I collected many interesting Hemiptera. Most of my time was spent collecting on a neighboring hillside facing the lake. Just back of this cleared area was dense timber. The vegetation was rather low and scanty consisting of clumps of grass, inter-

spersed with moss and various low growing weeds common to such a semi-xerophytic environment. Dead leaves swept in from above filled in the interspaces. As my method of collecting was rather unusual, it deserves a bit of explanation. My operation was very like a busy hen, scratching and searching for her juicy morsels among the dead leaves. Spreading my sifting cloth and lying down flat beside it with my nose close to the ground, I would begin the operation of pulling grass and weeds, scratching and searching, occasionally throwing the debris on the cloth for further search. Thus I gradually worked down the hill leaving the area behind me practically denuded and my bottles well filled. Why this particular hillside has such a rich hemipterous fauna I am unable to explain. One day while collecting it occurred to me that I might secure some quantitative results which would be worth recording. Measuring off an area 12 x 3 ft., and collecting there in this intensive manner for three hours resulted in 108 specimens of Hemiptera representing 21 species. Other forms of life such as many spiders, ants, a few beetles and myriapods were neglected. The complete list of Hemiptera is as follows:

Nysius thymi Wollf.	2	Drymus unus Say.	1
Zeridoneus costalis Van Duz.	4	Scolopostethus thomsoni Reut.	23
Ligyrocoris diffusus Uhl..	2	Pagasa fusca Stein.	1
Sphaerobius insignis Uhl.	1	Xylocoris cursitans Fall..	3
Ptochiomera ferruginea Stal.	12	X. sp.?	15
Stygnocoris rusticus Fall.	8	Lygus vanduzeei Knight.	1
S. pedestris Fall.	13	Philaenus spumarius Linn.	1
Plinthisus contractus Uhl.	1	Acucephalus nervosus Schr.	3
Kolonetrus plenus Dist...	2	A. flavostrigatus Donov..	4
Trapezonotus arenarius Linn.	9	Euscelis sp.?	1
		Agallia 4—punctata Prov.	1

H. G. Barber, Roselle, New Jersey.

The Fight Against Insect-Borne Diseases.

During 1927 the Rockefeller Foundation, in disbursing from income and capital $11,223,124, *inter alia*, helped Brazil to maintain precautionary measures against yellow fever; continued studies of that disease in West Africa on the Gold Coast and in Nigeria; and had a part in malaria control demonstrations or surveys in eight states of the Southern United States and in eleven foreign countries.

List of the Titles of Periodicals and Serials Referred to by Numbers in Entomological Literature in Entomological News.

1. Transactions of The American Entomological Society. Philadelphia.
2. Entomologische Blätter, red. v. H. Eckstein etc. Berlin.
3. Annals of the Carnegie Museum. Pittsburgh, Pa.
4. Canadian Entomologist. London, Canada.
5. Pysche, A Journal of Entomology. Boston, Mass.
6. Journal of the New York Entomological Society. New York.
7. Annals of the Entomological Society of America. Columbus, Ohio.
8. Entomologists' Monthly Magazine. London.
9. The Entomologist. London.
10. Proceedings of the Ent. Soc. of Washington. Washington, D. C.
11. Deutsche entomologische Zeitschrift. Berlin.
12. Journal of Economic Entomology. Concord, N. H.
13. Journal of Entomology and Zoology. Claremont, Cal.
14. Entomologische Zeitschrift. Frankfurt a. M., Germany.
15. Natural History, American Museum of Natural History. New York.
16. American Journal of Science. New Haven, Conn.
17. Entomologische Rundschau. Stuttgart, Germany.
18. Internationale entomologische Zeitschrift. Guben, Germany.
19. Bulletin of the Brooklyn Entomological Society. Brooklyn, N. Y.
20. Societas entomologica. Stuttgart, Germany.
21. The Entomologists' Record and Journal of Variation. London.
22. Bulletin of Entomological Research. London.
23. Bollettino del Laboratorio di Zoologia generale e agraria della R. Scuola superiore d'Agricultura in Portici. Italy.
24. Annales de la société entomologique de France. Paris.
25. Bulletin de la société entomologique de France. Paris.
26. Entomologischer Anzeiger, hersg. Adolf Hoffmann. Wien, Austria.
27. Bolletino della Società Entomologica. Genova, Italy.
28. Ent. Tidskrift utgifen af Ent. Föreningen i Stockholm. Sweden.
29. Annual Report of the Ent. Society of Ontario. Toronto, Canada.
30. The Maine Naturalist. Thornaston, Maine.
31. Nature. London.
32. Boletim do Museu Nacional do Rio de Janiero. Brazil.
33. Bull. et Annales de la Société entomologique de Belgique. Bruxelles.
34. Zoologischer Anzeiger, hrsg. v. E. Korschelt. Leipzig.
35. The Annals of Applied Biology. Cambridge, England.
36. Transactions of the Entomological Society of London. England.
37. Proceedings of the Hawaiian Entomological Society. Honolulu.
38. Bull. of the Southern California Academy of Sciences. Los Angeles.
39. The Florida Entomologist. Gainesville, Fla.
40. American Museum Novitates. New York.
41. Mitteilungen der schweiz. ent. Gesellschaft. Schaffhausen, Switzerland.
42. The Journal of Experimental Zoology. Philadelphia.
43. Ohio Journal of Sciences. Columbus, Ohio.
44. Revista chileña de historia natural. Valparaiso, Chile.
45. Zeitschrift für wissenschaftliche Insektenbiologie. Berlin.
46. Zeitschrift für Morphologie und Ökologie der Tiere. Berlin.
47. Journal of Agricultural Research. Washington, D. C.
48. Wiener entomologische Zeitung. Wien, Austria.
49. Entomologische Mitteilungen. Berlin.
50. Proceedings of the U. S. National Museum. Washington, D. C.
51. Notulae entomologicae, ed. Soc. ent. helsingfors. Helsingfors, Finland.
52. Archiv für Naturgeschichte, hrsg. v. E. Strand. Berlin.

53. Quarterly Journal of Microscopical Science. London.
54. Annales de Parasitologie Humaine et Compareé. Paris.
55. Pan-Pacific Entomologist. San Francisco, Cal.
56. "Konowia". Zeit. für systematische Insektenkunde. Wien, Austria.
57. La Feuille des Naturalistes. Paris.
58. Entomologische Berichten. Nederlandsche ent. Ver. Amsterdam.
59. Encyclopédie entomologique, ed. P. Lechevalier. Paris.
60. Stettiner entomologische Zeitung. Stettin, Germany.
61. Proceedings of the California Academy of Sciences. San Francisco.
62. Bulletin of the American Museum of Natural History. New York.
63. Deutsche entomologische Zeitschrift "Iris". Berlin.
64. Zeitschrift des österr. entomologen-Vereines. Wien.
65. Zeitschrift für angewandte Entomologie, hrsg. K. Escherich. Berlin.
66. Report of the Proceedings of the Entomological Meeting. Pusa, India.
67. University of California Publications, Entomology. Berkeley, Cal.
68. Science. New York.
69. Comptes rendus hebdoma. des séances de l'Académie des sciences. Paris.
70. Entomologica Americana, Brooklyn Entomological Society. Brooklyn.
71. Novitates Zoologicae. Tring, England.
72. Revue russe d'Entomologie. Leningrad, USSR.
73. Quarterly Review of Biology. Baltimore, Maryland.
74. Sbornik entomolog. národniho musea v Praze. Prague, Czechoslavokia.
75. Annals and Magazine of Natural History. London.
76. The Scientific Monthly. New York.
77. Comptes rendus heb. des séances et mémo. de la soc. de biologie. Paris.
78. Bulletin Biologique de la France et de la Belgique. Paris.
79. Koleopterologische Rundschau. Wien.
80. Lepidopterologische Rundschau, hrsg. Adolf Hoffmann. Wien.
81. Folia myrmecol. et termitol. hrsg. Anton Krausse. Bernau bei Berlin.
82. Bulletin, Division of the Natural History Survey. Urbana, Illinois.
83. Arkiv för zoologie, K. Svenska Vetenskapsakademien i. Stockholm.
84. Ecology. Brooklyn.
85. Genetics. Princeton, New Jersey.
86. Zoologica, New York Zoological Society. New York.
87. Archiv für Entwicklungs mechanik der Organ., hrsg. v. Roux. Leipzig.
88. Die Naturwissenschaften, hrsg. A. Berliner. Berlin.
89. Zoologische Jahrbücher, hrsg. v. Spengel. Jena, Germany.
90. The American Naturalist. Garrison-on-Hudson, New York.
91. Journal of the Washington Academy of Sciences. Washington, D. C.
92. Biological Bulletin. Wood's Hole, Massachusetts.
93. Proceedings of the Zoological Society of London. England.
94. Zeitschrift für wissenschaftliche Zoologie. Leipzig.
95. Proceedings of the Biological Soc. of Washington, Washington, D. C.
96. La Cellule. Lierre, Belgium.
97. Biologisches Zentralblatt. Leipzig.
98. Le Naturaliste Canadien. Cap Rouge, Chicoutimi, Quebec.
99. Mélanges exotico-entomologiques, Par Maurice Pic. Moulins, France.

Entomological Literature

COMPILED, WITH THE ASSISTANCE OF "BIOLOGICAL ABSTRACTS," UNDER THE SUPERVISION OF E. T. CRESSON, JR.

Under the above head it is intended to note papers received at the Academy of Natural Sciences, of Philadelphia, pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species will be recorded.

The numbers **within brackets** [ ] refer to the journals, as numbered in the list of Periodicals and Serials published in the January and June numbers (or which may be secured from the publisher of Entomological News for 10c), in which the paper appeared. The number of, or annual **volume,** and in some cases the part, heft, &c. the latter **within** ( ) follows; then the pagination follows the **colon** :

All continued papers, with few exceptions, are recorded only at their first installments.

*Papers containing new forms or names have an * preceding the author's name.

(S) Papers pertaining exclusively to neotropical species, and not so indicated in the title, have the symbol (S) at the end of the title of the paper.

For records of Economic Literature, see the Experiment Station Record, Office of Experiment Stations, Washington. Also Review of Applied Entomology, Series A, London. For records of papers on Medical Entomology, see Review of Applied Entomology, Series B.

☞ *Note the change in the method of citing the bibliographical references, as explained above.*

Papers published in the Entomological News are not listed.

GENERAL—Crampton, G. C.—The grouping of the insect orders and their lines of descent. [9] 61: 82-85, ill. **Cutright & Huber.**—Growth condition of the host as a factor in insect abundance. [7] 21: 147-153. **Durrant, J. H.**—Obituary. [10] 30: 40. [9] 61: 73-75, port. [21] 40: 47-48, port. **Edwards, F. W.**—Insect collecting in the Southern Andes. [15] 1: 111-125, ill. **Eisinger, F.**—Die Insekten in der alten Heilkunde. [14] 41: 446-447, cont. **Forbes, W. T. M.**—What is a name? [68] 67: 373. **Friedrich, H.**—Maskierte Tiere. [Kosmos] 25: 116-120, ill. **Frost, S. W.**—Insect scatology. [7] 21: 36-46. **Hendrickson, G. O.**—Some notes on the insect fauna of an Iowa prairie. [7] 21: 132-138. **Kuhlgatz, T.**—Nomenclator animalium generum et subgenera. 2: 797-956. Corneo-Deros. **McAtee, W. L.**—"Biological species" from the standpoint of the insect taxonomist. [10] 30: 38-39. **Michelmore, A. P. G.**—A fly milking an aphid. [9] 61: 90-91. **Watson, J. R.**—Citrus insects of Honduras. [39] 11: 53-54.

ANATOMY, PHYSIOLOGY, ETC.—Cleveland, L. R.—Further observations and experiments on the symbiosis between termites and their intestinal protozoa. [Biol. Bull.] 54: 231-237. **Crampton, G. C.**—The eulabium, mentum, submentum and gular region of insects. [13] 20: 1-18, ill. **Demoll, R.**—Untersuchungen über die Atmung der Insekten. [Zool. Jahrb. Abt. Allg. Zool. und Phys. der Tiere]

(Hesse Festschrift) 45: 515-534, ill. **Dusham, E. H.**—The larval wax glands of the dogwood sawfly (Macremphytus varianus Norton). [7] 21: 92-96, ill. **Ewing, H. E.**—The legs and leg-bearing segments of some primitive Arthropod groups, with notes on leg-segmentation in the Arachnida. [Smiths. Misc. Coll.] 80: No. 11, 1-41, ill. **Glaser, R. W.**—Evidence in support of the olfactory function of the antennae of insects. [5] 34: 209-215. **Jobling, B.**—The structure of the head and mouth parts in Culicoides pulicaris (Nematocera). [22] 18: 211-236, ill. **Lozinski, P.**—Ueber die Spinndrüsen der Wespenlarven. II: Histologie und Zytologie. [Bull. Intern. Acad. Polonaise Sci. & Lett.] 3: 161-209, ill. **Muller, H. J.**—Erzeugung neuer tierformen durch Röntgenstrahlen. [Die Umschau] 32: 314-316, ill. **Monne, L.**—Untersuchungen zur Genetik der Raupenzeichnung des Schwammspinners (Lymantria dispar). [Bull. Intern. Acad. Polonaise Sci. & Lett.] 3: 403-415, ill. **Truszkowski, R.**—Les diastases purinolytiques des Invertébrés. [77] 98: 1048.

ARACHNIDA AND MYRIOPODA.—*Cook & Loomis.—Millipeds of the order Colobognatha, with descriptions of six new genera and type species, from Arizona and California. [50] 72: 1-26, ill. **Hassan, A. S.**—The biology of the Eriophyidae with special reference to Eriophyes tristriatus. [67] 4: 342-383, ill. **Wiehle, H.**—Vom radnetz der Spinnen. [Der Nat. forsch., Berlin.] 4: 1-6.

THE SMALLER ORDERS OF INSECTA.—Britton, W. E.—European hen flea in Connecticut. [12] 21: 437. **Broughton, E.**—Some new Odonata nymphs. [4] 60: 32-34, ill. **Calvert, P. P.**—Report on Odonata [collected by the Barbados-Antigua Expedition], including notes on some internal organs of the larvae. [Iowa Studies Nat. Hist.] 12: 3-44, ill. **Carpenter, F. M.**—A scorpion-fly from the Green River eocene. [3] 18: 241-248, ill. ***Esben-Peterson, P.**—Neue und wenig bekannte Neuropteren des Hamburger museums. (S) [11] 1928: 73-77, ill. ***Hood, J. D.**—New Neotropical Thysanoptera collected by C. B. Williams. [5] 34: 230-246. ***Pic, M.**—Neue Malacodermen. (S) [34] 76: 95-98. **Pomeyrol, R.**—La parthénogenese des Thysanopteres. [78] 62: 2-19. ***Richter, W.**—Beitrag zur kenntnis der Aeolothripiden (Thysanoptera. [11:] 1928; 29-37, ill. [n. gen. for neotrop. sp.] ***Ris, F.**—Die ausbeute der deutschen Chaco-Expedition 1925-26. (S) [56] 7: 40-49, ill. **Ryvez, M.**—Les mouches a truites Perles Nêmoures, Sialis. [La Nat.] 1928: 369-370, ill. **Wilson, F. H.**—Notes on the collection of Mallophaga. [4] 60: 27-28.

ORTHOPTERA.—Champlain, A. B.—Denizens of the cracks and dark corners. [Nature Mag.] 11: 304-306, ill.

HEMIPTERA.—*Ball, E. D.—The genus Draeculacephala and its allies in North America. (Rhynchota). [39:] 11: 33-40. **Drake & Harris.**—Tetraphleps canadensis, a true Tetraphleps. [4] 60: 50. **Esaki, T.**—Contribution to the knowledge of the genus Nepa (Nepidae). [75] 1: 434-441, ill. **Essig, E. O.**—Rice bugs. [55] 4: 128. **Frothingham, L.**—Notes on the periodical Cicada on Cape Cod, Mass., 1906-1923. [Bull. Boston Soc. Nat. Hist.] 1928: 7-10. ***Gillette & Palmer.**—Notes on Colorado Aphididae. [7] 21: 1-20, ill. **Hungerford, H. B.**—Concerning Kirkaldy's Notonecta mexicana varieties Hades and Ceres. (Notonectidae) [55] 4: 119-120. **Hungerford, H. B.**—Melanchroism in Notonecta borealis. [4] 60: 76. ***Hungerford, H. B.**—Some recent studies in aquatic Hemiptera. [7] 21: 139-144, ill. ***Hungerford, H. B.**—Two new Notonecta from South America. (Notonectidae) [7] 21: 119-120. **Johnson, C. W.**—The periodical Cicada in New England. [Bull. Boston Soc. Nat. Hist.] 1928: 3-6, ill. **Morrill, A. W.**—Sonora cotton square dauber (Creontiades debilis). [12] 21: 437. **Readio, P. A.**—Studies on the biology of Reduviidae of America north of Mexico. [Univ. Sci. Bull.] 17: 6-291, ill. **Simm, K.**—Die Rosenzwergzikade (Typhlocyba rosae). Ein Beitrag zur Kenntnis der Jassiden. [Bull. Intern. Acad. Polonaise Sci. & Lett.] 3: 67-85, ill. **Titschack, E.**—Der Fühlernerv der Bettwanze, Cimex lectularius und sein zentrales Endgebiet. [Zool. Jahrb. Abt. Allg. Zool. und Phys. der Tiere] (Hesse Festschrift) 45: 437-462. **Thompson, W. L.**—The seasonal and ecological distribution of the common aphid predators of central Florida. [39] 11: 49-52.

LEPIDOPTERA.—Anon.—Celerio gallii intermedia. [on St. Paul Island, Alaska] [55] 4: 136. ***Bang-Haas, O.**—Horae Macrolepidopterologicae. 1: 128, ill. **Barnes & Benjamin.**—On the identity of four species of Geometridae. [55] 4: 133-136. **Barnes & Benjamin.**—On the distribution of Perizoma osculata (Geometridae). [55] 4: 120. ***Cassino, S. E.**—Some new Lasiocampidae. [The Lepidopterist] 4: 89-96. **Chandler, S. C.**—Codling moth hibernation studies. [12] 21: 315-318. ***Clark, B. P.**—Sundry notes on Sphingidae and descriptions of ten new forms. [Pro. New England Zool. Club] 10: 33-46. **Forbes, W. T. M.**—A key to the forms of the genus Chlosyne. (Nymph.) [7] 21:

98-100. **Frohawk, F. W.**—Variation of Pieris napi. [9] 61: 76-77, ill. **Gadeau, H.**—Résultat de l'accouplement de femelles décapitées avec des mâles normaux et ponte d'abdomens isolés chez le Bombyx du mûrier. (Sericaria mori L.). [25] 1928: 70-71. **Gonner, P.**—Der Trauermantel (Vanessa antiopa Linné) und sein Formenkreis. [14] 41: 435-442, cont. ***Gunder, J. D.**—A Review of genus Zerene in the United States. [55] 4: 97-102. ***Keiffer, H. H.**—California Microlepidoptera III. [55] 4: 129-132. ***Kruger, R.**—Eine neue Erycinide; Symmachia margaretha. Castnia cacica forma discomaculata. (S [14] 41: 442-443. **Petersen, W.**—Die Blattminierergattungen Lithocolletis u. Nepticula. [60] 88: 113-174, ill. **Riley, N. D.**—The Oberthür collection of butterflies and moths. [15] 1: 83-90. **Turner, H. J.**—Lycaena. [Note on the name]. [21] 40: 33-34.

DIPTERA.—*Alexander, C. P.—Studies on the crane-flies of Mexico. (Tipuloidea). [7] 21: 101-119. **Aldrich, J. M.**—The flies of the western mountains. [Smiths. Inst.] 1928: 67-72, ill. ***Alexander, C. P.**—Records of crane-flies (Tipulidae) from Ontario. [4] 60: 54-60. ***Bau, A.**—Cuterebra ornata, spec. nov. (Cuterebrinae). (S) [56] 7: 50-51. **Broadbent, B. M.**—Developmental history of the narcissus bulb fly at Washington, D. C. [12] 21: 353-357. ***Curran, C. H.**—Two new species of Wagneria (Tachinidae). [4] 60: 48-49. ***Czerny, L.**—Ergänzungen zu meiner monographie der Helomyziden. [56] 7: 52-55. **Ferris, G. F.**—The genus Brachypteromyia (Hippoboscidae). [55] 4: 140-142, ill. **Johnson, C. W.**—The Tricyphona inconstans on Nantucket Island, Mass. [5] 34: 216-217, ill. ***Krober, O.**—Neue und wenig bekannte Dipteren aus den familien Omphralidae, Conopidae und Therevidae. (S) [56] 7: 1-23, ill. ***Lindner, E.**—Die ausbeute der deutschen Chaco-Expedition. (S) [56] 7: 24-36, ill. ***Malloch, J. R.**—Exotic Muscaridae. (S) [75] 1: 465-494, ill. **Martini, E.**—Ueber die segmentale Gliederung nematocerer dipteren. [34] 76: 83-95, ill. **Martini & Kalandadze.**—Ueber die segmentale Gliederung nematocerer dipteren. [34] 76; 67-83, ill. ***Smith, L. M.**—Distinction between three species of Eumerus (Syrphidae), with description of a new species. [55] 4: 137-139, ill. **Townsend, M. T.**—Seasonal abundance and vertical migrations of Lucilia caesar and other insects in an artificial grove. [7] 21: 121-129, ill. ***Van Duzee, M. C.**—Three new Dolichopodids from Western Canada. [4] 60: 40-42.

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and descriptions of new species of Lucanidae and Cerambycidae from Western North America. [55] 4: 105-113. ***Wendeler, H.**—Paederognathus nom. nov. (Staphylin.). [11] 1928: 37. ***Wolcott, G. N.**—The may beetles of Haiti (Scarabaeidae). [10] 30: 21-29, ill. **Wymore, F. H.**—On Dinapate wrighti. [55] 4: 143. ***Zimmermann, A.**—Neuer Beitrag zur kenntnis der schwimmkäfer. [48] 44: 165-187.

HYMENOPTERA.—Alfken, J. D.—Beitrag zur kenntnis einiger Chalicodoma-arten. (Apid.) [11] 1928: 41-44. **Box, H. E.**—Algunos parasitos de los huevos de Diatraea saccharalis en Tucuman. [Rev. Ind. Agric. Tucuman] 18: 5-8, ill. **Box, H. E.**—Los parasitos conocidos de las especies americanas de Diatraea. (Pyralidae) [Rev. Ind. Agric. Tucuman] 18: 53-61. ***Brethes, J.**—Parasitos e hiperparásito de Diatraea saccharalis en la caña de azúcar, en Tucumán. [Rev. Ind. Agric. Tucuman.] 17: 163-166. **Criddle, N.**—The introduction and establishment of the larch sawfly parasite, Mesoleius tenthredinis, into Southern Manitoba. [4] 60: 51-53. **Custer, C. P.**—Nesting habits of a solitary bee of the genus Spinoliella. [5] 34: 199-202, ill. **Custer, C. P.**—On the nesting habits of Melissodes. [4] 60: 28-31, ill. ***Dozier, H. L.**—Two undescribed Aphelinid scale parasites from Delaware (Aphelinidae). [10:] 30: 35-38, ill. ***Fox, C. L.**—A new Stictiella from Texas (Bembecidae). [55] 4: 103-104. ***Graenicher, S.**—Bees of the genus Halictus from Miami, Florida. [5] 34: 203-208. **Hayward, K. J.**—Miscellaneous notes from Argentina. Ants in flooded areas. [21] 40: 54-55. **Hicks, C. H.**—Parasites and habits of Dianthidium pudicum. [5] 34: 193-198. **Holldobler, K.**—Zur Biologie der diebischen Zwergameise (Solenopsis fugax) und ihrer Gäste. [97] 48: 129-142. **Kleine, R.**—Bestimmungstabelle der Brenthidae. [14] 41: 444-445, cont. **Martin, C. H.**—Biological studies of two hymenopterous parasites of aquatic insect eggs. [70] 8: 105-156, ill. **Rau, P.**—The nesting habits of the wasp, Chalybion caeruleum. [7] 21: 25-35. ***Rohwer, S. A.**—Preoccupied name in Hymenoptera. [10] 30: 38. **Salman, K. A.**—Notes on Phlebatrophia mathesoni in Maine. [12] 21:432. **Scullen, H. A.**—Bees belonging to the family Bremidae taken in Western Oregon, with notes. [55] 4: 121-128. **Smith, R. C.**—Lasius interjectus (Formicidae), a household pest in Kansas. [Jour. Kansas Ent. Soc.] 1: 14-18. **Wilder, M. C.**—Observations on the Ichneumon-fly Epiurus pterophori. [5] 34: 227-229, ill.

EXCHANGES

This column is intended only for wants and exchanges, not for advertisements of goods for sale. Notices not exceeding three lines free to subscribers.

These notices are continued as long as our limited space will allow; the new ones are added at the end of the column, and only when necessary those at the top (being longest in) are discontinued.

For Exchange—A large number of living cocoons of Actias selene, Philosamia cynthia, etc., in winter. Send for list.—Vee Kung Yu, c/o Bureau of Entomology, Kashing, Chekiang Province, China.

For Exchange—South American and Celebes butterflies by 100 monthly arrivals, also South and North American pupae and cocoons. Mrs. Emma Kessler, 499 Manhattan Ave., New York.

Exchange—Northern Idaho Lepidoptera to exchange for exotics or other showy specimens. C. W. Herr, Priest River, Idaho.

Canarian Fauna—For all particulars apply to H. E. Appenhagen, Sta Cruz, Teneriffe, Apartado No. 202.

I am revising the genus *Ceuthophilus* (Orthoptera, Tettigoniidae, Rhaphidophorinae), and will be glad to have material from any part of the country for study and determination. Specimens will be promptly returned.—Theodore H. Hubbell, Museum of Zoology, University of Michigan, Ann Arbor, Michigan.

Lepidoptera from all parts of the world in exchange for rarer Sphingidae, Saturnidae and Bombycidae from the Southern States and Mexico. Send lists of desiderata to Henry Wormsbacher, 1357 St. Charles Ave., Lakewood, Ohio.

Wanted: live pupae of large moths, especially Actias luna, by purchase or in exchange for silkworm eggs.—John H. Gerould, 36 Occom Ridge, Hanover, N. H.

Western Lepidoptera: Sphingidae, Aegeriidae, Cossidae, Catocala and the major Bombycidae in exchange for equally rare species of the same families. Short lists of the *very rare species* only, desired. O. C. Poling, Box 82, Fort Davis, Texas, U. S. A.

Mycetophilidae—Will exchange or identify material in this family. C. F. Adams, Indiana State Board of Health, Indianapolis, U. S. A.

Wanted—"Check List of the Lepidoptera of Boreal America" by Wm. Barnes and J. McDunnough. Kindly quote price. E. J. Dornfeld, 144 North Ave., Milwaukee, Wis.

Wanted—Moths of any species of the genus **Apantesis:** also eggs or larvae. Will determine specimens. Want to hear from anyone who will collect in this genus. Dr. E. T. Learned, Fall River, Mass.

Wanted—Names and addresses of collectors in foreign countries, also some second-hand insect cases. Write Mrs. Robert Milde, Lewiston, Minn.

Catopini—Catops (Choleva), Prionochaeta, Ptomaphagus. Wanted to borrow all possible specimens of these genera from North America for a revisional study. Correspondence solicited. Melville H. Hatch, Dept. of Zoology, Univ. of Wash., Seattle, Wash.

Chrysomelidae—Cryptocephalinae and Halticinae—will exchange insects of other orders for above named leaf-bettles. Also many duplicates in other groups of coleoptera.—Paul N. Musgrave, 514 Mt. Vernon Ave., Fairmont, W. Va.

Argynnis of the world wanted by exchange for local Lepidoptera, or by purchase. S. P. Hayes, Jr., Amherst College, Amherst, Mass.

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COLEOPTERA

908.—**Chapin** (E. A.).—The North American species of Ptilodactyla (Helodidae). (Trans., **53**, 241-248, 1 pl., 1927)..... .20

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904.—**Braun** (A. F.).—Descriptions of new microlepidoptera. (Trans., **53**, 191-199, 1927) ..... .20

910.— **Williams** (R. C., Jr.).—Studies in the neotropical Hesperioidea. Paper 2. (Trans., **53**, 261-291, 2 col. pl., 1927) 1.20

911.—**Jones** (F. M.).—The mating of the Psychidae. (Trans., **53**, 293-312 6 pls., 1927) ..... .55

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907.—**Rehn** (J. A. G.).—On new and certain previously known American genera of the Acridinae with specific comments and descriptions. (Trans., **53**, 213-240, 1 pl., 1927) ..... .60

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905.—**Bromley** (S. W.).—The genus Microstylum in Madagascar (Asilidae). (Trans., **53**, 201-207, 1927) ..... .20

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